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TWO NORTHEASTERN ALLIES OF *SALIX LUCIDA*.

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Salix lucida, with its lustrous foliage and closely flowered golden-yellow staminate aments, is one of the handsomest and easiest recognized of New England willows. As it ordinarily occurs in eastern America the species is a large shrub, but occasionally, when undisturbed, it develops into a small tree twenty-five feet high, with trunks even six inches in diameter. Through the greater portion of its range the species is, for a willow, very constant in its characters; but during the past few years the fact has been more than once impressed upon the writer that in extreme northeastern New England and adjacent Canada *Salix lucida* gradually becomes notably different from the typical shrub, while on the western borders of New England occurs a beautiful shrub so unlike *S. lucida* in many characteristics that by some who know it it has been taken for quite another species.

True *Salix lucida* has the leaves glossy and green on both surfaces, glabrous or glabrate, though when very young bearing some crisp early-deciduous colored hairs. Its mature leaves taper to very elongate (caudate) usually curved tips, while in general outline the leaf varies from lanceolate to ovate.

The variation of *Salix lucida* which is characteristic of extreme northeastern New England and adjacent Quebec and New Brunswick was first detected by Messrs. Emile F. Williams and J. Franklin Collins in 1900, although the plant, with its peculiarity unnoticed, for two years had lain in the writer's herbarium. The material first collected by Messrs. Williams and Collins was from a fine tree at Fort Kent, Maine; and during the summer of 1901 additional speci-

mens from the same source were secured by Mr. Williams, Dr. B. L. Robinson, and the writer. The foliage of the Fort Kent tree was very long for *S. lucida* and the under surfaces of the leaves, especially along the veins, were pubescent with persistent rufous hairs. A comparison made by the writer of this material and an authentic sheet of Andersson's *S. lucida*, var. *macrophylla* led him to identify the Fort Kent tree with Andersson's variety from British Columbia. Subsequently, however, the pubescent-leaved extreme has been watched in northern Maine and Quebec, particularly upon the upper St. Francis where it abounds, and a more detailed examination shows that it cannot well be treated as identical with the British Columbian willow with which it was at first placed.

Salix lucida, var. *macrophylla*, as shown in the Gray Herbarium by a specimen of Lyall's from the Lower Frazer River, has the ample young leaves glaucous and glabrate beneath, though minutely pubescent on the midrib above, and it is apparently a phase of the extreme western *S. lasiandra*, Benth. The northern Maine willow which was once referred by the writer to *S. lucida*, var. *macrophylla*, proves upon further study to differ very constantly in having the leaves green and not glaucous beneath and permanently pubescent on the nerves beneath with sordid or rufescent hairs. This plant with permanent pubescence is found to vary in size from a small shrub of cold swamps, with mature leaves only 4 or 5 cm. long, to well developed trees of rich alluvium, with leaves often 15 cm. in length. Except in the abundance and permanence of the pubescence there seems no other character by which to separate the northern Maine willow from narrow-leaved forms of glabrous or early-glabrate *S. lucida*; but as a variety with marked geographic range it is worthy separation as

SALIX LUCIDA, Muhl., var. *intonsa*. Shrub or small tree, rarely becoming 7 or 8 m. high with trunk 1.3 dm. in diameter: branches of the first year pubescent with mostly permanent sordid or rufescent hairs: mature leaves elliptic-lanceolate, taper-pointed, 4 to 15 cm. long, 1 to 3.5 cm. broad, permanently pubescent, especially on the veins beneath.—*S. lucida*, var. *macrophylla*, Fernald, according to Williams, RHODORA, iii. 277, not Andersson.—By streams and in swamps, St. John River and tributaries, Maine, Quebec, and New Brunswick; Mattawamkeag River, Maine; and Restigouche River, New Brunswick. The following herbarium specimens have been

examined. MAINE, Beau Lac, St. Francis River, August 14, 1902 (*W. W. Eggleston & M. L. Fernald*); Fort Kent, July 22, 1900 (*J. F. Collins & E. F. Williams*), August 11, 1901 (*B. L. Robinson, E. F. Williams & M. L. Fernald*); Island Falls, July 9, 10, 1898 (*M. L. Fernald*, nos. 2452, 2453); NEW BRUNSWICK, Toms Island, Restigouche River, July 30, 1896 (*G. U. Hay*).

The other willow of New England, which, by some who have known it either in the field or the herbarium, has been reluctantly placed with *Salix lucida*, is a remarkable shrub with a varied history. The attention of New England botanists was directed to it in 1899, when Mr. Ralph Hoffmann reported from "a peat-bog in Stockbridge, Mass., a handsome willow, growing as a shrub fifteen feet or less in height"; with the additional notes that "the persistence, or late ripening of the fruit is particularly characteristic; a branch collected September 24, still retains its half opened capsules. The willow grows plentifully in beds of sphagnum, in company with *Betula pumila* L. and *Sarracenia purpurea* L. Mr. C. E. Faxon, who has kindly examined a branch, pronounces it *Salix amygdaloides*, Anders.,"¹ a species then unrecorded east of central New York.

On June 1, 1900, Mr. Hoffmann collected from the Stockbridge bog material in pistillate flower which has been deposited in the herbarium of the New England Botanical Club; and on May 31, 1902, in a deep larch-swamp among the Taconic Mountains, at Salisbury, Connecticut, scarcely twenty-five miles from the Stockbridge bog this handsome willow, in staminate flower, greatly perplexed Messrs. C. H. Bissell, J. R. Churchill, and the writer. In the Salisbury swamp, as at Stockbridge, the willow was associated with *Betula pumila*, while *Salix candida*, *Carex Schweinitzii*, *C. tetanica*, *C. teretiuscula*, var. *ramosa*, and other characteristic plants of the Taconic region were in this or adjacent swamps. At the time of collection the Salisbury shrub was not identified with the Stockbridge willow which had been taken for *Salix amygdaloides*; for, as the Salisbury shrub had the leaves lustrous-green above with gland-tipped petioles, and short-oblong staminate aments, it was temporarily placed with *S. lucida*. Unlike that species, however, which was in the neighborhood, the Salisbury willow had the leaves very pale or even whitened beneath, the character ordinarily relied upon

to distinguish from the eastern *S. lucida* the extreme western *S. lasiandra*. Accordingly, in his recent account of the Salisbury excursion Mr. Bissell has suggested¹ the possibility that further observation may show the presence of *S. lasiandra* in eastern America.

In attempting to settle this problem Mr. Bissell has brought to the writer excellent fruited specimens of the Salisbury willow, which now proves to be quite the same as Mr. Hoffmann's Stockbridge shrub; while an examination of the Gray Herbarium shows the plant to extend southwestward to the mountains of northern New Jersey, and to reappear on Lakes Superior and Michigan; and some fragments from the Bebb Herbarium, generously furnished by Dr. C. F. Millspaugh of the Field Columbian Museum, show it to be also in western New York, northern Ohio and northern Minnesota. The suite of specimens now before him have encouraged the writer to make a detailed comparison of the shrub with the three species to which it has been variously referred, *Salix amygdaloides*, *S. lucida* and *S. lasiandra*, and from them all it proves to be abundantly distinct.

Aside from its firm thick elliptic-lanceolate finely crenulate-serrate leaves which in maturity are pale or whitened beneath and on gland-tipped petioles, the shrub is characterized in early summer by short-oblong dense staminate aments (1 to 1.5 cm. long, 1 to 1.2 cm. thick), the short peduncle, rachis, and short obovate pale straw colored entire scales, softly pubescent with white hairs; the pistillate aments rather loosely flowered, in anthesis 1.5 to 2.5 cm. long, with white-pilose oblong entire bluntish scales. But the most striking condition of the plant is in late September and October when the fruit is mature. Then, when the firm discoloured leaves are about to fall, the matured pistillate aments are 2 to 3.5 cm. long, 2 to 2.5 cm. thick. The spreading capsules are olive or bronze-tinged (rarely pale), thick-walled, conic-subulate in outline, 7 to 12 mm. long, and on thickish pedicels which are only twice as long as the tongue-shaped gland.

From all three species, *Salix amygdaloides*, *S. lucida*, and *S. lasiandra*, with which isolated specimens of this autumn-fruiting willow have been sometimes associated, it is quickly separated by three significant characters: its very late fruiting, the fruiting material at hand having been collected at dates from September 8 to October 9, while the fruited specimens in the Gray Herbarium of *S. amygda-*

¹ RHODORA, v. 34.

loides were collected from May 23 to June 26, of *S. lucida*, May 27 to June 25, of *S. lasiandra*, June 15 to July 7; its thick-walled, conic-subulate capsules which in maturity are 7 to 12 mm. long, the thinner-walled capsules of *S. amygdaloides* being conic-ovoid, 4 to 5 mm. long of *S. lucida* and of *S. lasiandra* narrowly conic-ovoid, 4.5 to 6.5 mm. long; and the thickish pedicels which are about twice as long as the gland, while in *S. lasiandra* the more slender pedicel is three times as long as the gland, in *S. amygdaloides* and *S. lucida* often four or five times as long.

From *Salix amygdaloides* the late-fruiting willow is further distinguished by its short thick aments and by the gland-tipped petioles; from *S. lucida*, as already stated, by its elliptic-lanceolate leaves which are acute or short-acuminate but rarely caudate-attenuate at tip, and pale or sometimes whitened beneath. In leaf-outline it is not unlike some forms of the western *S. lasiandra*, but in view of the three important distinctions already pointed out, the eastern shrub is hardly to be identified with that Cascade Mountain tree.

The only willow which in its conic-subulate capsule and gland-tipped petioles approaches the shrub is the European *Salix pentandra*, a tree which is occasionally cultivated but rarely established about towns from New England to Ohio. That tree, however, has oblong or ovate-oblong leaves, green on both surfaces, the flower-scales glabrous or at first pubescent at base with stiff straightish hairs; and the slightly shorter mature capsules, at least in the American form, subcordate instead of narrowed at base. Furthermore, as *S. pentandra* occurs in New England it matures and loses its fruit in mid-summer.

A search through local floras of the regions from which this shrub of our inland sphagnous swamps is known, reveals several interesting notes, all emphasizing its leading characteristic — the late flowering and fruiting. Thus, in Dudley's Cayuga Flora we find: "***S. lucida***, Muhl., var. ——— with beautiful shining, coriaceous, very finely serrate leaves, larger, light-brown pods, and flowers and fruits very much later than in the type, occurs in the Round-Marshes. I have also collected it in Bergen Swamp, N.Y., from which place Mr. Bebb has received it, as well as sparingly from N. J., Ohio, and Mich. Flowers from June 10–30 and matures fruits slowly, the writer obtaining pods still in excellent condition, Sept. 9, 1880." ¹ [In the same district

¹ Dudley, Cayuga Flora (1886) 87.

Prof. Dudley found *S. lucida* flowering "May 20-30." In the Report on Botanical Work in Minnesota for the year 1886, the shrub, though meagrely described, was treated with more assurance as "**Salix lucida** Muhl., var. **serissima** Bailey (*n. var.*). Differs from the species in fruiting very late. It occurs at Lansing, Mich., where its fruit matures in September, assuming a bright red color in the sun. It is one of the most ornamental of the willows. B 357, Mud river; in fruit."¹ Two years later, Dr. N. L. Britton, noting from northern New Jersey stations for supposed *S. lucida*, said: "In Sussex county this willow holds its fertile catkins until late in September."² And, again in 1896, in the account of Plants of Monroe County, New York, and adjacent Territory, Misses Beckwith and Macauley recorded "**S. lucida**, Muhl., var. ——— ? In Bergen Swamp. Flowers June 10-30; fruit last of Aug. to Sept."³

That the observations of Messrs. Hoffmann, Bissell, and others in western New England are borne out by these records is very obvious. Furthermore, examination of material of Prof. Dudley's Cayuga shrub and of the original numbered plant from Minnesota and the Lansing (Michigan) material of Bailey's *Salix lucida*, var. *serissima* shows that those plants are quite like the shrub of the Berkshire and Taconic swamps; while one of the specimens first identified with the material from western New England was a finely fruited branch from a swamp in Sussex county, New Jersey.

The late-flowering and fruiting shrub with long thick-walled capsules appears, then, as specially emphasized in the comparisons on a preceding page, to be quite distinct from other willows of the *Pentandrae*; and the name first applied to it when Prof. Bailey considered it a variety of *S. lucida* recognizes its most obvious characteristic. Its characters and known history may be briefly summarized as follows.

SALIX serissima. Shrub, sometimes 4 m. high; the branches covered with olive-brown lustrous bark, branchlets brown or yellow-tinged, glabrous, lustrous: leaves elliptic-lanceolate, or on young shoots sometimes oblong-lanceolate, acute or short-acuminate, in maturity dark shining green above with a broad whitish midrib, pale or whitened beneath, thick and firm, 4 to 8 (on sterile young shoots

¹ Bailey in Arthur, Geol. & Nat. Hist. Surv. Minn., Bull. no. 3 (1887) 19.

² Britton, Cat. Pl. N. J. (1889) 226.

Beckwith & Macauley, Proc. Rochester Acad. Sci. iii. (1896) 103.

even 10 or 11) cm. long, 1 to 3.5 cm. broad, closely and finely glandular-serrulate; the slender lustrous petioles tipped by 1 to 3 pairs of glands: winter buds lance-oblong, 5 to 7 mm. long, olive-brown or castaneous, lustrous: aments on short white-pilose peduncles, terminating short leafy branches: the staminate ament short-oblong, 1 to 1.5 cm. long, 1 to 1.2 cm. thick, the rachis white-pilose; scales short-obovate, entire, pale straw-color, white-pilose; filaments loosely hairy at base: pistillate aments loosely flowered, in anthesis narrowly oblong, 1.5 to 2.5 cm. long, with white-pilose oblong entire bluntish scales; style evident; stigmas 2, thick, 2-lobed; mature ament 2 to 3.5 cm. long, 2 to 2.5 cm. thick, the spreading-ascending mostly olive or brown-tinged thick-walled lustrous conic-subulate capsules 7 to 12 mm. long, their thickish pedicels 1 to 2 mm. long, twice exceeding the oblong-lingulate gland.—*S. lucida*, var., Dudley, Cayuga Fl. (1886) 87. *S. lucida*, var. *serissima*, Bailey in Arthur, Geol. & Nat. Hist. Surv. Minn., Bull. no. 3 (1887) 19. *S. lucida*, in part, Britton, Cat. Pl. N. J. (1889) 226. *S. lucida*, var.?, Beckwith & Macauley, Proc. Rochester Acad. Sci. iii. (1896) 103. *S. amygdaloides*, C. E. Faxon according to R. Hoffmann, RHODORA, i (1899) 229, not Andersson. *S. sp.*, C. H. Bissell, RHODORA, v. (1903) 33.—In deep sphagnous bogs or larch-swamps, from the Housatonic Valley, Massachusetts, to the north shore of Lake superior, south to Morris Co., New Jersey, western New York, northern Ohio, Michigan, Wisconsin and Minnesota, flowering from late May to late June or early July, the fruit mature from late August to October. MASSACHUSETTS, peat-bog, Stockbridge, September 24, 1899, June 1, 1900 (*Ralph Hoffmann*): CONNECTICUT, larch-swamps, border of Twin Lakes, Salisbury, October 9, 1901 (*C. H. Bissell*, no. 5511), May 31, 1902 (*C. H. Bissell & J. R. Churchill*), near State Line, Salisbury, May 31, 1902 (*C. H. Bissell, J. R. Churchill, & M. L. Fernald*), Sept. 22, 1903 (*C. H. Bissell*): NEW JERSEY, margin of pond near Sparta, Sussex Co., September, 1867 (*C. F. Austin*); Budd's Lake, Morris Co., August 6, 1869 (*T. C. Porter*—Field Columbian Museum, no. 2804): NEW YORK, Round-Marshes, McLean (*W. R. Dudley*—Field Col. Mus., no. 5904); Buffalo (*G. W. Clinton*—Field Col. Mus., nos. 4370, 4372): OHIO, Painesville, Lake Co., 1871 (*H. C. Beardslee*—Field Col. Mus., no. 7106); Ashland Co., July 11, 1899 (*Selby & Boyd*, no. 1488—Field Col. Mus., no. 103208): ONTARIO, Pic River, Lake Superior (*Loring*): MICHIGAN, Flint, 1871 (*D. Clarke*—Field Col. Mus., nos. 2426, 2427); Lansing (*L. H. Bailey*—Field Col. Mus., no. 6401); Jackson, Sept. 8, 1893 (*S. H. & D. R. Camp*—Field Col. Mus. no. 2709): WISCONSIN, Milwaukee (old specimen, presumably from Lapham, in Gray Herb.): MINNESOTA, Mud River, Vermillion Lake, July 28, 1886 (*Arthur, Bailey, & Holway*, no. B 357—Field Col. Mus., no. 6390).

The stations from which we know *Salix serissima* suggest that it

should be looked for at other points in New England and New York. Its occurrence with *Betula pumila*, *Salix candida*, *Carex Schweinitzii*, and other characteristic swamp plants of the Berkshire and Taconic Mountain region, indicates that it may be sought with some confidence in Bennington County, Vermont, and with real assurance in Dutchess and Columbia Counties, New York. In fact, the junction of these two counties of New York with Litchfield County, Connecticut, is at the base of Mount Riga, just north of the State Line swamp where *Salix serissima* was first studied by the writer. Larch swamps to all appearances the same extend westward from northern Litchfield County nearly to the Hudson Valley, and are characterized¹ by *Betula pumila*, *Salix candida*, *Valeriana sylvatica*, *Viburnum Opulus*, *Cypripedium spectabile*, *Carex Schweinitzii*, *C. tetanica*, *C. teretiusecula*, var. *ramosa*, etc., all of which with the exception of *Valeriana* (abundant only three miles west of Salisbury) are among the typical plants of the Stockbridge or the Salisbury marshes; while many of them occur with *Salix serissima* in the swamps of northern New Jersey, in the famous Bergen Swamp of Genesee County, New York, or in the marshes near Cayuga Lake. It will, then, be indeed surprising if an exploration of similar tracts fails to reveal in eastern New York, as in western Massachusetts, northwestern Connecticut, northern New Jersey, and northwestern New York, *Salix serissima* as a companion of these notable species.

GRAY HERBARIUM.

NOTES ON NEW ENGLAND VIOLETS.

E. BRAINERD.

(Plate 50.)

A MOST noteworthy instance of the segregation of an old species is to be found in the recent treatment of the common blue violet. The polymorphous group of plants included in the last edition of the Gray Manual under *Viola palmata* and its var. *cucullata*, it is now proposed to divide up into at least thirty species.

This radical treatment of a common and familiar plant, though not

¹ See L. H. Hoysradt, Bull. Torr. Cl. VI. appendix.